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| 10/781,709      | 02/20/2004  | Tomohiro Sakai       | 089367-0123         | 4198             |

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EXAMINER

MEHRMANESH, ELMIRA

ART UNIT

PAPER NUMBER

2113

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/781,709 | <b>Applicant(s)</b><br>SAKAI, TOMOHIRO |  |
|                              | <b>Examiner</b><br>Elmira Mehrmanesh | <b>Art Unit</b><br>2113                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The application of Sakai, for a "Disk array device" filed February 20, 2004, has been examined.

Claims 1-21 are presented for examination.

Information disclosed and listed on PTO 1449 has been considered.

Claims 19-21 are rejected under 35 USC § 101.

Claims 1-3, and 5-21 are rejected under 35 USC § 102.

Claim 4 is rejected under 35 USC § 103.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 19-21 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Uchida (U.S. Patent No. 6,330,620).

As per claim 1, Uchida discloses a disk array device including a component that can be degraded (Fig. 1) and comprising:

a trouble point storage unit which stores a point value of the component (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on the component (Fig. 5)

a degradation unit (col. 2, lines 39-41) which degrades the component when the point value stored in said trouble point storage unit falls below a reference value (col. 2, lines 63-67)

a trouble point recovery unit which adds an another predetermined point value to the point value stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had added to the point value a last

time (Fig. 4).

As per claim 2, Uchida discloses a disk array device including a component that can be degraded (Fig. 1) and comprising:

a trouble point storage unit which stores a point value of the component (Fig. 2, element 12)

a point update unit which adds a predetermined point value from the point value stored in said trouble point storage unit and stores the added point value in said trouble point storage unit, when a processing fault occurs on the component (Fig. 5)

a degradation unit (col. 2, lines 39-41) which degrades the component when the point value stored in said trouble point storage unit falls below a reference value (col. 2, lines 63-67)

a trouble point recovery unit which subtracts an another predetermined point value to the point value stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had subtracted to the point value a last time (Fig. 4).

As per claim 3, Uchida discloses a disk array device which can degrade a plurality of disks (Fig. 1) and comprises:

a trouble point storage unit which stores point values of each disk (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the corresponding point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on one of the disks (Fig. 5)

a degradation unit (col. 2, lines 39-41) which degrades the component when the point value stored in said trouble point storage unit falls below a reference value (col. 2, lines 63-67)

and a trouble point recovery unit which adds an another predetermined point value to each point values stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had added to the point value a last time (Fig. 4).

As per claim 5, Uchida discloses a point initialization unit which sets, in a case where a defective disk is replaced, a point value corresponding to the defective disk stored in said trouble point storage unit to an initial value (Fig. 3).

As per claim 6, Uchida discloses degradation unit receives a point update notification concerning a disk number from said trouble case point update unit, and determines whether the point value stored in said trouble point storage unit in association with the disk number is equal to or lower than a predetermined reference value, and degrades a disk having the disk number in a case where determining that the

point value is equal to or lower than the reference value (col. 2, lines 27-67).

As per claim 7, Uchida discloses point update unit notifies information indicating that the point value has been updated to said degradation unit (col. 2, lines 61-67).

As per claim 8, Uchida discloses a disk array device (Fig. 1) comprising:

a trouble point storage unit which stores a point value of the component (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on the component (Fig. 5)

a processing rate adjusting unit which lowers a processing rate of a component in a case where the point value of the component stored in said trouble point storage unit becomes equal to or lower than a reference value, and sets the processing rate of the component to a predetermined normal state in a case where the point value of the component stored in said trouble point storage unit exceeds the reference value (col. 7, lines 21-30)

a trouble point recovery unit which adds an another predetermined point value to the point value stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit added to the point value a last time

(Fig. 4).

As per claim 9, Uchida discloses a disk array device which can degrade a plurality of disks (Fig. 1) comprising:

a trouble point storage unit which stores point values of each disk (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the corresponding point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on one of the disks (Fig. 5)

a processing rate adjusting unit which lowers a processing rate of a disk in a case where the point value of the disk stored in said trouble point storage unit becomes equal to or lower than a reference value, and sets the processing rate of the disk to a predetermined normal state in a case where the point value of the disk stored in said trouble point storage unit exceeds the reference value (col. 7, lines 21-30)

a trouble point recovery unit which adds an another predetermined point value to each point values stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had added to the point value a last time (Fig. 4).

As per claim 10, Uchida discloses the plurality of disks is mirrored (Fig. 1, element 31)

said processing rate adjusting unit lowers a processing rate of a disk and raises a processing rate of a disk paired with the disk in a case where the point value of the disk stored in said trouble point storage unit becomes equal to or lower than the reference value, and sets the processing rate of the disk and the processing rate of the paired disk to the predetermined normal state in a case where the point value of the disk stored in said trouble point storing unit exceeds the reference value (col. 7, lines 21-30).

As per claim 11, Uchida discloses processing rate adjusting unit reads the point values of each disk storing in said trouble point storage unit; determines whether or not the point value change from greater than the reference value to equal to or lower than the reference value, and lowers a processing rate of a disk in a case where determining that the point value of the disk change to equal to or lower than the reference value (col. 7, lines 21-30) and determines whether or not the point value change from equal to or lower than the reference value to greater than the reference value, and adjusts a processing rate of a disk so as to set a predetermined initial rate in a case where determining that the point value of the disk change to greater than the reference value (col. 7, lines 21-30).

As per claim 12, Uchida discloses a component degradation method in which a disk array device, having a plurality of components degradable (Fig. 1) and a memory storing point values regarding each of the plurality of components (Fig. 2, element 12), comprises:

subtracting a predetermined point value from the point value stored in said memory and storing the subtracted point value in said memory, when a processing fault occurs on one of the components (Fig. 5)

degrading the component when the point value stored in said memory falls below a reference value; and adding an another predetermined point value to the point value stored in said memory, when a predetermined time period passes since a last addition of the point value (col. 2, lines 63-67).

As per claim 13, Uchida discloses a component degradation method in which a disk array device, having a plurality of components degradable (Fig. 1) and a memory storing point values regarding each of the plurality of components (Fig. 2, element 12), comprises:

adding a predetermined point value from the point value stored in said trouble point storage unit and storing the added point value in said trouble point storage unit, when a processing fault occurs on the component (Fig. 4).

degrading the component when the point value stored in said trouble point storage unit exceeds a reference value; and subtracting an another predetermined point value to the point value stored in said trouble point storage unit, when a predetermined time period passes since last subtraction of the point value (col. 2, lines 63-67)

As per claim 14, Uchida discloses a component degradation method in which a disk array device, having a plurality of components degradable (Fig. 1) and a memory

storing point values regarding each of the plurality of components (Fig. 2, element 12), comprises:

subtracting a predetermined point value from the corresponding point value stored in said memory and storing the subtracted point value in said memory, when a processing fault occurs on one of the disks (Fig. 5)

degrading a corresponding disk when the point value stored in said memory falls below a reference value (col. 2, lines 63-67)

adding an another predetermined point value to each point values stored in said memory, when a predetermined time period passes since a last addition of the point value (Fig. 4).

As per claim 15, Uchida discloses memory stores first point values and second point values regarding each of the plurality of disks (Fig. 2, element 12) said disk degradation method comprises: subtracting a first predetermined point value from the corresponding first point value stored in said memory and storing the subtracted point value in said memory, when a processing fault occurs on one of the disks (Fig. 5)

subtracting a second predetermined point value from the corresponding second point value stored in said memory and storing the subtracted point value in said memory, in a case where a processing time for a required processing exceeds a reference time on one of the disk (Fig. 5)

degrading a corresponding disk when the first point value stored in said memory falls below a first reference value or the second point value stored in said memory falls below a second reference value (col. 2, lines 63-67)

adding an another predetermined point value to each point values stored in said memory, when a predetermined time period passes since a last addition of the point value (Fig. 4).

As per claim 16, Uchida discloses setting each point value corresponding to the defective disk stored in said trouble point storage unit to an initial value, in a case where a defective disk is replaced (Fig. 3).

As per claim 17, Uchida discloses method of restricting a drop in performance of a disk array device wherein a disk array device, having a plurality of disks (Fig. 1), a memory storing point values regarding each of the plurality of disks (Fig. 2, element 12) comprises: subtracting a predetermined point value from the corresponding point value stored in said memory and stores the subtracted point value in said memory, when a processing fault occurs on one of the disks (Fig. 5)

lowering a processing rate of a disk in a case where the point value of the disk stored in said memory becomes equal to or lower than a reference value; setting the processing rate of the disk to a predetermined normal state in a case where the point value of the disk stored in said memory exceeds the reference value (col. 7, lines 21-30)

adding some point value to each point value stored in said memory, when a predetermined time period passes since a last addition of the point value (Fig. 4).

As per claim 18, Uchida discloses disk array device further has a control unit (Fig. 1, element 10) controlling read processing and write processing on each of the plurality of disks (Fig. 1, element 31), comprises:

issuing an instruction to the control unit so that a processing rate of a disk is lowered in a case where it is detected that the point value of the disk stored in the memory becomes equal to or lower than the reference value, and issuing an instruction to said control unit so that the processing rate of the disk is changed to a predetermined normal rate in a case where it is detected that the point value of the disk stored in the memory becomes greater than the reference value (col. 7, lines 21-30).

As per claim 19, Uchida discloses a computer program (col. 5, lines 41-47) for controlling a computer having of degradable component (Fig. 1) to act as:

a trouble point storage unit which stores a point value of the component; a point update unit which subtracts a predetermined point value from the point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on the component (Fig. 5)

a degradation unit (col. 2, lines 39-41) which degrades the component when the point value stored in said trouble point storage unit falls below a reference value (col. 2, lines 63-67)

a trouble point recovery unit which adds an another predetermined point value to the point value stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had added to the point value a last time (Fig. 4).

As per claim 20, Uchida discloses a computer program (col. 5, lines 41-47) for controlling a computer having a plurality of degradable disks (Fig. 1) to act as:

a trouble point storage unit which stores point values of each disk (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the corresponding point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on one of the disks (Fig. 5)

a degradation unit (col. 2, lines 39-41) which degrades the component when the point value stored in said trouble point storage unit falls below a reference value (col. 2, lines 63-67)

a trouble point recovery unit which adds an another predetermined point value to each point value stored in said trouble point storage unit, when a predetermined time period passes since the trouble point recovery unit had added to the point value a last time (Fig. 4).

As per claim 21, Uchida discloses a computer program (col. 5, lines 41-47) for controlling a computer having a plurality of degradable disks (Fig. 1) to act as:

a trouble point storage unit which stores point values of each disk (Fig. 2, element 12)

a point update unit which subtracts a predetermined point value from the corresponding point value stored in said trouble point storage unit and stores the subtracted point value in said trouble point storage unit, when a processing fault occurs on one of the disks (Fig. 5)

a processing rate adjusting unit which lowers a processing rate of a disk in a case where the point value of the disk stored in said trouble point storage unit becomes equal to or lower than a reference value, and sets the processing rate of the disk to a predetermined normal state in a case where the point value of the disk stored in said trouble point storage unit exceeds the reference value (col. 7, lines 21-30)

a trouble point recovery unit which adds an another predetermined point value to each point values stored in said trouble point storage unit, when a predetermined time passes since the trouble point recovery unit added to the point value a last time (Fig. 4).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida (U.S. Patent No. 6,330,620) in view of Furuya et al. (U.S. PGPUB No. 20020049886).

As per claim 4, Uchida discloses disk array device further comprises a processing-time-reference exceeding case point update unit which subtracts a predetermined point value from the point value stored in said processing-time-reference exceeding case table, in a case where a processing time for a required processing exceeds a reference time on a disk (Fig. 5)

wherein said degradation unit (col. 2, lines 39-41) degrades a corresponding disk when the point value stored in said trouble case table falls below a first reference value or the point value stored in said processing-time-reference exceeding case table falls below a second reference value (col. 2, lines 63-67)

Uchida fails to explicitly disclose a table.

Furuya teaches:

wherein said trouble point storage unit comprises a trouble case table (Fig. 1, element 7a) storing point values of each disk and a processing-time-reference exceeding case table storing point values of each disk; wherein said trouble case point update unit updates point value stored in said trouble case table (page 3, paragraph [0054]).

It would have been obvious to one of ordinary skill in the art at the time the invention to use the method of Arrayed I/O unit close decision of Uchida in combination with the data storage array of Furuya for a higher reliability array system.

One of ordinary skill in the art at the time the invention would have been motivated to make the combination because Uchida discloses a memory for storing the point values of disks (Fig. 2, element 12). Furuya disclose a memory for storing the point values of disks, which contains a table (Fig. 1, element 7a).

### **Related Prior Art**

The following prior art is considered to be pertinent to applicant's invention, but nor relied upon for claim analysis conducted above.

Ng et al. (U.S. Patent No. 5,278,838), "Recovery from errors in a redundant array of disk drives".

Iso et al. (U.S. Patent No. 5,612,933), "Apparatus for reproducing recorded information with error detection and correction processing".


Seki et al. (U.S. Patent No. 5,812,761), "Disk array system".

### Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmira Mehrmanesh whose telephone number is (571) 272-5531. The examiner can normally be reached on 8-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert W. Beausoliel can be reached on (571) 272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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